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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/031,706	05/15/2002	Virinder Grewal	2000P1907	6354

7590 11/18/2003
Lerner & Greenberg
PO Box 2480
Hollywood, FL 33020-2480

EXAMINER

DEO, DUY VU NGUYEN

ART UNIT PAPER NUMBER

1765

DATE MAILED: 11/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/031,706

Applicant(s)

GREWAL ET AL.

Examiner

DuyVu n Deo

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 August 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☒ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-5, 7-15, 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Tsai (US 5,880,033).

Tsai describes an etching method comprising: providing a reactor chamber having an upper inductive and lower capacitive means (col. 3, line 8, 9); adjusting the power setting of the upper conductive means at the range of 200-2000 Watts (col. 5, line 5-10) (this includes claimed range of 50-600 watts; therefore, it would also provide claimed a uniformity better than 10% in etching a wafer with a diameter of 8 inches at a rate of etching between 50-500 nm/min or 200-400 nm/min); placing wafer having diameter of 6-12 inches (this also includes wafers of more than 8 inches in diameter) into the reactor chamber (col. 5, line 35-36); plasma etching the metal silicide and polysilicon layer (claimed stacked gate array or stacked gates of MOSFETs) (col. 4, line 37-39).

Referring to claims 2-4, 15 the stacked gate array comprises polysilicon, a tungsten or titanium silicide (claimed tungsten or titanium-silicon) layer on a layer of silicon dioxide (claimed oxide) (col. 4, line 5-20).

Referring to claim 5, the plasma etching comprises of feeding etching gases into the chamber and energizing the inductive and capacitive means to form plasma from the etching gases to etch the wafer (col. 5, line 1-25).

Referring to claim 7, Tsai's method would also have the reaction chamber to be ready (claimed recreating the reaction chamber) before the step of plasma etching. Otherwise, there would not be any etching.

Referring to claim 8, the etching gases include Cl₂, O₂, and N₂ (Col. 3, line 10, 11).

Referring to claims 10 and 12, the capacitor means is ranged from 100-2000 watts (col. 5, line 14-16) (this would includes claimed range within 0-200 watts).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsai as applied to claim 5 above, and further in view of Jain et al. (US 6,613,682).

Referring to claim 6, it would be desired and obvious for one skill in the art to adjust the processing parameters so that the adsorption rate is bigger than a desorption rate of gas particles on the etching surface since the gas particles have to adsorb the surface in order to etch the surface. Otherwise, there would be hardly any etching if the adsorption rate is less than the desorption rate. Furthermore, Jain shows that the processing parameters including gas flow,

pressure, and temperature are result-effective variables and they are determined through experiments in order to provide optimum conditions to etch the substrate (col. 6, line 45-61).

5. Claims 16 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsai and Jain as applied to claims 15 and 17 above, and further in view of Lee et al. (US 5,665,203).

Tsai shows the etching gas for metal silicide comprises HCl, Cl₂, and N₂ or nitrogen-containing gases (col. 7, line 5-10, line 44, 45). Jain shows other nitrogen-containing gas is used for etching metal silicide includes NF₃ (col. 6, line 14). Tsai shows the polysilicon is etched with HCl, Cl₂, and O₂ (col. 7, line 5-10, claim 2). Unlike claimed invention, Tsai and Jain do not describe etching the polysilicon with HBr and at least Cl₂ or O₂ when approaching the gate oxide. Lee teaches a method for poly gate where the polysilicon is etched with HBr and O₂ (col. 4, line 52-55). It would have been obvious for one skill in the art to modify above prior art in light of Lee by etching the poly with HBr and O₂ because Lee teaches to use those gases to provide selectivity to the silicon dioxide (or gate oxide) so that it is not punched through (col. 4, line 52-63).

Claim Objections

6. Claim 1 is objected to because of the following informalities: the limitation of "placing the wafer with a diameter of more 8 inch..." should be written as "placing the wafer with a diameter of more than 8 inch..." Appropriate correction is required.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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8. Claim 7 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The limitation of "recreating reaction chamber before the step of plasma etching" is unclear and vague. At this time, this limitation is understood as performing the steps of claim 5 before the etching.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to DuyVu n Deo whose telephone number is 703-305-0515.

DVD

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